



RUTHERFORD

FORUM

195 COMPUTER NEWSLETTER

FORUM CENTRAL COMPUTER NEWSLETTER

Number 7 June 1979

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Programme for 195 Representatives Meeting

Wednesday 4 April 1979

Rutherford Laboratory Lecture Theatre.

09.45 COFFEE

10.00 Introduction

10.05 Recent Enhancements to the System

W Walkinshaw (Head of C & A Division)

10.15 The IBM 3032, a general introduction

J W Burren (Head of Applications Group)

10.40 Coupling the 3032 to the 195s

A R Mayhook (Systems Group)

11.00 General Meeting

Updated meeting notes are given here and the considered answers to some of the questions raised.

11.45 The Introduction of Three Character Identifiers

T G Pett (Systems Group)

12.30 Parallel Category Meetings

LUNCH

13.45 Remote Users Session

C Balderson (Telecommunications Group)

14.30 FINISH

14.30 Category Representatives Meeting

ATTENDANCE

C & A DIVISION

D M Asbury, J W Burren, B J Davies, E B Fossey, R M Freeman,
D S Greenaway, P J Hemmings, D F Parker, T G Pett, D Rowley,
P C Thompson, D H Trew, S H Ward.

Attendance

Category Representatives

J Barlow	Film Analysis
K C Jeffrey	NERC
N J Diserens	Tech RL
M W Johnson	NBRU
B Martin	UCL
R Maybury	HEP Counters
M J O'Connell	SNS
K Robinson	ACD
C Webb	Laser

Group Representatives and Others

J W Alcock	Bristol
J R Ashford	Exeter
K R Bentley	IOS(Bidston)
P Bewick	Imperial College
I Bloodworth	Birmingham HEP
C Blamey	AWRE
T A Broome	SNS
M W Butler	Daresbury
J V Carey	RGO
E F Clayton	Imperial College Film Analysis
D Collins	IOS(Wormley)
J Conboy	UCL
D H Cooper	Oxford(Chem)
M Coupland	UCL
P Dacre	Sheffield Univ.(Chem)
J K Davies	Muon Collaboration
J M Dickson	Admin RL
D N Edwards	Liverpool
R J Ellison	Manchester
J Finch	Exeter
A C Flesher	Detector Physics RL
D A Garbutt	Imperial College
F D Gault	Durham/Theory
L Gill	UCE(ORLS)
M Godden	UCE(ORLS)
T P Gray	Cambridge
M Grayson	Sheffield Univ.(Chem)
P Green	IGS
R Growen	MSSL
J Hopkins	Daresbury
H E Huckle	MSSL
R Carter	NERC
P Johnson	Liverpool
L Jones	Oxford
P Kent	ACD
K J Knowles	NBRU
G T Laws	Salford University
C Leary	IOS(Wormley)
D H Long	Appleton

Attendance

A P Lotts	Durham
J Macallister	Oxford
I C MacArthur	Bristol(HEP)
F MacDonald	Birmingham
B Mack	RGO
R Marchal	Daresbury
D McGregor	ISC(Newbury)
B McKenzie	Theo. Chem. Oxford
A J Middleton	Tech RL
C Moglestue	Reading
D Munro	Surrey
T Murphy	Daresbury
P J Negus	Glasgow/Film Analysis
P Norrington	Theo. Chem. Oxford
J Payne	ARD Culham
H Phelan	IGS
A W Robertson	HEP
T B Robinson	Oxford(Theoretical)
W von Schlippe	Westfield College/Theory
D Scott	NERC/ITE
B T Sewell	Birkbeck College London
T P Shah	HEP
J Smyth	Forestry Commission
R Templeman	Institute of Hydrology
I J Tickle	Birkbeck College London
H Watson	HEP
F Wickens	HEP
J Young	AWRE

NOTES FOR 195 REPRESENTATIVE'S MEETING 4 APRIL 1979

1. INTRODUCTION

In April and May the IBM 3032 computer will be brought into service and it will initially provide additional Back End processor capacity on the existing dual 360/195 complex, as well as allowing 70, rather than the present 60, active ELECTRIC slots. A period of many months of software development will ensue, after which the 3032 will perform the Front End tasks now undertaken by the the Front End 195 processor, but during which the 3032 will continue to provide its initial service.

It has been announced that Mr W Walkinshaw OBE is to retire as head of Computing and Automation Division at the end of August 1979. Professor F R A Hopgood will become head of the computing services at the Rutherford Laboratory on 1st September 1979.

2. HARDWARE

2.1 General

Four new IBM 3350 disk drives (317.5Mbytes) were installed during February and a Block Multiplexor Channel was installed during March. Since the meeting we have seen the installation of IBM-compatible consoles and controller, a further 8 3350 disk drives and a 3830 disk controller. The existing 3830 has been upgraded, and 4 of the model 1 disk drives have been upgraded to model 11's (double density).

The IBM 3032 was delivered in March and installed in early April.

2.2 Performance

Although both 195 processors have given good service since October 1978, there was a high level of incidents between January and March. Some hardware problems have been resolved, but an intermittent fault on the Back End processor has undoubtedly affected the service to users. The number of jobs run and accounted to users each week has during the same period passed the previous highest levels on many occasions.

2.3 Shutdowns

It was expected that the 195's would be unavailable for about 12 hours on Saturday 7th April, and for a shorter duration in the period 17th - 21st April, to permit the installation of additional hardware.

2.4 Maintenance

Maintenance is carried out on Thursdays from 15.00 to 19.00. Maintenance dates for the remainder of 1979 are as follows:

195/1 - 5 April, 3 May, 7 June, 5 July, 9 August, 6 September, 4 October, 8 November, 6 December.

195/2 - 19 April, 17 May, 21st June, 19 July, 23 August, 20 September, 18 October, 22 November, 20 December.

3032 - 24 May, 28 June, 26 July, 30 August, 27 September, 25 October, 29 November, 27 December.

2.5 System Development

The system will continue to be required for System Development on Tuesdays and Thursdays from 17.30 to 19.00.

There may also be a number of short interruptions to service to allow the introduction of new software. Watch for Newsheets giving the details.

3. SYSTEM SOFTWARE

3.1 HASP and OS

A new version of the Operating System, Release 21.8F, was introduced on both machines during December and after initial problems seems to be working well.

Work has commenced on the software for the triple system.

3.2 ELECTRIC

The level 2 archive data set has been moved on to a double density 3330 giving some 70,000 blocks of extra space. As the space on level 1 is dwindling rapidly, users are requested to move infrequently used files to level 2. We do not in general expect to issue much space at level 1. It is up to the user to see that his files are divided correctly between the two levels.

The space in the online data set almost ran out early in February, necessitating an archive to level 1 of all files unused for 6 months. The online dataset is now on a 3350 disk.

ELECTRIC now permits the use of positional parameters and, for terminal users only, space as an alternative separator to comma. Details of these and some other changes are given in Section 3 of this issue of FORUM.

3.3 MAST

The work reported on a new version of MAST to provide more slots has been completed since the meeting. Terminals which are connected asynchronously (either directly or through a terminal switching system such as GANDALF) to the Memorex 1270 now have terminal addresses in the range 513 to 767. Terminals connected through workstations have addresses in the range 0 to 255.

3.4 T.D.M.S.

Most of the facilities described in Section D12 of CIGAR are now available; if an attempt is made to use a command that is not yet released a suitable message will be printed. The main facilities not available are as follows:

- i) The PASSWORD facility is not available.
- ii) The CHANGE command is available only with OWNER and DEVTYPE.
- iii) The LIST command is available as described, except that the current release does not recognise corporate fields such as OWNER. Use ID & ACCT instead.

4. WORKLOAD

Between January and March the 195's were still heavily loaded with production work and had a large backlog of priority 1 work. Turnround guidelines were still however generally being met.

5. DISKS

5.1 FREEDISK

When the transfer of some of the permanently mounted system packs to the 3350's was completed at the end of April, FREEDISK (USDSK1) and ATLAS (RHELO8) became double density packs.

5.2 Private Packs

Work is in hand to upgrade the 100 Mbyte disk spindles to 200 Mbyte. Data on private disks is to be moved by arrangement with the owners of the disks.

5.3 Catalogued Datasets

Users are reminded that catalogued datasets must use the prefix USER. The reason for this is that there is more than one catalogue and the prefix is used as a cross reference between them. If the correct prefix is not used users could find their datasets catalogued on one machine and not the other. From time to time unauthorised catalogue entries are removed.

5.4 Device Types for Disks

The MVT system now running on the 195's and the 3032 is now correctly differentiating Model 1 and Model 11 3330 disks. Two problems have been noticed as a result of this:

- i) People with old versions of IDVICE linked into their programs will not get a correct return value for 3330 Model 11's or 3350's. The version that has been in RHELIB for over a year is correct, and users with this problem should re-link-edit, REPLACEing IDVICE.
- ii) Users who have UNIT=3330 in their JCL will have had JCL errors on 3330 Model 11's. As stated in CIGAR, UNIT=DISK30 should be used for 3330's (Models 1 and 11); we would recommend UNIT=DASD to allow simple migration to the use of 3350's in the future. An update to the relevant section of CIGAR will be prepared.

6. WORKSTATIONS AND TELECOMMUNICATIONS

The GEC2050 at Southampton has been provided with X25 networking software. This enables 'calls' to be made to ELECTRIC on the 195 or to TSO on the Daresbury 370/165 from terminals connected to the workstation. These calls are made through a GEC4080 packet switching exchange which allows access to either mainframe even if the other is down. Other services will be added to the 4080 exchange in the near future, including the Data Editing GEC4080 and the ICF's GEC4070 Multi User Minis. Other workstations will from now on be gradually added to the exchange as required and as development permits.

Another recent acquisition is a GANDALF terminal switch which enables terminals to select a host computer. This is in addition to the locally developed Terminal Switching System (TSS) which performs a similar function.

Authorised users of the 195 can now gain access through the London University Network (Metronet), via the node at Imperial College. See Section 6 of this issue of FORUM.

A job level link between the 195 and the CERN 370/168-3033-CDC7600 complex has been established. See Section 7 of this issue of FORUM.

7. LIBRARIES AND PACKAGES

7.1 NAG Licence

Users of the NAG Library are reminded that its use is the subject of a licence agreement. In particular, no copies of any of its subroutines may be taken to other installations. This includes the export of a load module of a program containing a NAG subroutine. Access to the source code is limited and if any user makes any alteration to a NAG subroutine (which needs permission) he is obliged to change the name, but copyright of the modified subroutine belongs to NAG. Users who wish to consult the licence agreement should contact User Support Group.

The registration card signed by every user is now deemed to apply to all licenced software. Any questions about permissible use should be referred to User Support Group.

7.2 GLIST (Dataset Copying and Listing Utility)

There have been problems copying large blocksize datasets with GLIST because it ran out of core and abended 80A or 804. An extra parameter BSPACE (default 32K) has been added to solve this. For large blocksizes increase BSPACE and REGION by the same amount. Two buffers are required for both input and output

streams. The largest options usually required are when copying full track datasets; with BSPACE=100K and REGION=170K full track blocks of card images may now be copied. If the record length is also large BSPACE and REGION may need to be increased further.

7.3 VIEW and VIEW\$ (Interpreting FR80 output into MUGWUMP Files)

A completely new program to perform this function is now available and may be used by means of procedure VIEW. VIEW was previously an alias of VIEW\$ although this fact was not documented. The old VIEW program is now only available by means of procedure VIEW\$. The new VIEW program has many additional features and will be the subject of a Graphics Usernote. By default the leading 3 or 4 identifier frames produced under the old program are now suppressed. In other ways the effect of the programs should be equivalent except that output from HLINEs is not correctly interpreted.

7.4 RLSUMX

The procedure RLSUMX (alias RLSUMX4) has been modified so that the first step uses the current Rutherford supported version of PATCHY (4.02).

This is described in RL-78-100 'PATCHY on the RL dual 195 Computers'. (See also DOC=ALERT.PATCHY).

Changes principally affect stream numbers, PAM files and Cradles:

- If it is necessary to define extra Fortran streams in the P step of RLSUMX the above document should be consulted.
- PAM files which are card images need to be converted to binary PAM files with YTOBIN.
- Certain statements in the Cradle which were acceptable to PATCHY3 are not recognised by PATCHY4.

Note also that the PATCHY listings are no longer dummied out. Users will need to be careful about how much is printed if it is all going to be printed again during the compile step. The MAP option has been switched off in the Link-Edit step.

The Procedures RLSUMX1 and RLSUMX3 are not affected.

7.5 SMOG

Several bugs in SMOG have been cured, notably one in FRENTS that caused any intensity orders produced when only the colour 'red' was selected to be ignored.

7.6 Supported Packages

Mark 4.01 of the GENSTAT statistical package has been implemented on the 195's and a Usernote is being prepared. The level of support is 'Minimum'.

The following packages are also being added to the List of Supported Packages, published in the last FORUM. They are all given 'standard' support by HEP Division.

BABBAGE	Produces formatted listing of Babbage programs
XREF	plus cross-reference table.
ZBOOK	FORTTRAN callable dynamic memory management system.
MTUT	Initialises and checks GEC 4080 tapes.
TPELEC	Copies files from a GEC 4080 tape to ELECTRIC.
TRANSFER	Copies ELECTRIC files to a GEC 4080 tape.
PRINT	Prints files on a 4080 tape.
COPYTP	Copies 4080 tapes.
MORTRAN	Structured FORTTRAN pre-processor.
DAP16	Cross-assembler for Honeywell DDP516.
INFOL	Database Report Generator.

7.7 LISP and REDUCE

The Cambridge version of the LISP system, which includes REDUCE, has been implemented. Symbolic Algebra Usernote 4 will be issued shortly.

8. SHORT ITEMS

8.1 Telephone Numbers

Last November Rowstock telephone numbers were changed to 6 figure Abingdon numbers. Those of special interest to users are:

<u>Old Number</u>	<u>New Number</u>
Code:0235-83	Code:0235
631 (ELECTRIC Datel 200 service)	834531
251 (Telecommunications)	834251
486 (Shift Leader and Telecommunications)	834486
8056 (ELECTRIC Datel 600 service)	831756

Meeting Notes

8.2 Users' Addresses

Users who normally receive output via the courier or by post are reminded that they must notify Mrs. Scholes in writing of any change of address. Failure to do so will result in output being misdirected.

8.3 Identifiers

The increase in the number of users has meant there is now pressure to provide more identifiers, and three character identifiers are being introduced. See Section 9 of this issue of FORUM.

8.4 Procedure BCX (BCPL One Step Monitor)

The parameters CPARM (default '/NKPH') and LINECNT (default 78) have been added to this procedure. The default options on the compiler are now 'P78 /NKPHG&GPARM'.

8.5 RL TN Print Train

Some extra characters are now available on the IBM TN print train at RL, usually accessed by the use of FORMS=555. No characters have been removed from the train, but some (notably the superscript digits) now occur only once on the train instead of twice. The new characters added are as follows:

- Grave (Hex 79)
- Circumflex (Hex 71)
- Backslash (Hex E0)
- Four Arrows (Hex CB, CC, CD, CE)
- Pound Sign (Hex DB)
- Varies As (Hex E1)
- Boolean And (Hex 73)
- Boolean Or (Hex 72)

The codes are those by which the characters are accessed from EBCDIC. The train will now print all characters in RL Standard ASCII (see RL-76-121/C for details). No changes to any existing programs are necessary, but translation tables ECET, ECTN, EOET, EOTA, EOTN, EOYT and EOZT have been modified so that the new characters are printed. EOTA is now effectively a null translation table.

Work is in hand to define and implement an escape mechanism whereby characters not available on a keyboard may be input to files. Until then the codes must be produced by a user program or by the Cambridge Editor escape mechanism (see RL-77-136/C).

8.6 R1 Workstation

Because of a shortage of Operators it has become necessary to temporarily stop the 1130 workstation service in the evenings from 17.30 hours. Users adversely affected by the curtailment of service should contact D.G. House or G.A. Lambert.

8.7 IBM 1403 Lineprinter - R26 User Area

One of the IBM 1403 lineprinters has been made available for users whose output is printed in Building R26. Printing can be directed to this printer, which will be generally user operated, by specifying the FORMS parameter on the HASP job statement as 1403, e.g:

```
//MYJOB JOB (ACCT, ID, , , , 1403), .....
```

A limit of 5000 lines will be placed on this printer but special arrangements can be made via the Shift Leader to exceed this limit outside prime shift hours.

8.8 DRAFT

A program called DRAFT has been written which simplifies the drawing of diagrams. It is particularly designed to assist the illustration of manuals. Two procedures, DRAFT and DRAFTMUG, are provided. A short guide is available from C.D.Osland.

8.9 RL-78-005

It was originally intended to publish this document with a title such as 'RL Graphics Facilities'. This has now been superseded and RL-78-005 will be the major new manual 'RL Graphics User's Guide'. This will be a self-contained loose-leaf publication (like CIGAR). Some chapters of it will be available shortly. Its Introduction will cover the same ground as was intended for RL-78-005 and will be available first.

8.10 IBM Documents

The provision of IBM manuals, especially in user areas of R1 and R27, is being revised in preparation for the advent of the 3032 and VM. Group Representatives for groups in R1 and R27 have been sent details. A complete set of relevant IBM manuals is being set up in the R27 library.

8.11 FLIST

Draft copies of a writeup are available from C.D.Osland.

8.12 Tape Library

The LOCAL Library is under increasing pressure for space, and users are requested to ask the librarian to remove tapes from this library if they do not need to be held there.

Users wishing to contact the Tape Librarian via the MESS or MAIL facility in ELECTRIC are warned not to use the identifier JJ. The Tape Librarian may be contacted via the identifier JU.

8.13 Large Core Jobs on the Front End

Users who are still running large core jobs which need the Front End Machine (e.g. using /*NEEDS ELECTRIC) are warned that after the introduction of the 3032 it will not be possible to run jobs greater than 350K on the Front End Machine.

8.14 PL/1 Optimizing Compiler

This compiler has now been installed. The names for the procedures to use it begin with PX and are directly analogous to those for the F-Level compiler, i.e. PXC, PXCL, PXCLG, etc. Procedures which also invoke the Assembler are still being written. See also Section 5 of this issue of FORUM.

8.15 Use of the SPACE Parameter

It is important to use accurate values in the SPACE parameter. There are many instances when users have specified values such as (TRK,(2,2)) resulting in the data being distributed in small pieces all over the disk, rather than in a single extent. For example, there is a dataset occupying 28 tracks broken into 14 extents; the read heads have to be moved to cylinders 210, 735, 751, 634, 88, 798, 774, 749, 647, 231, 621, 387, 397 and 392, reading 2 tracks only before having to move to another cylinder. A specification of (TRK,30) would almost certainly have obtained the space required in 2 adjacent cylinders, with practically no arm movement required during access to the dataset. Unnecessary arm movements not only increase the wait time of the jobs concerned but also add to the congestion of the I/O channels, affecting the whole system including ELECTRIC response. We would prefer datasets to be over allocated, though not grossly so, if this meant they could be accommodated in the primary space. If the size of the dataset is constant then using the RLSE parameter when the dataset is first written will have the effect of discarding any unused space.

QUESTIONS RAISED AT THE 195 GROUP REPRESENTATIVES MEETING

Coupling the 3032

Q1. Will the interests of TSO users be looked after during the transition period?

A1. The interests of 'network' users will be protected during the transition to the 3032 as the Rutherford front-end processor and it will be possible for users to continue to use TSO at Daresbury via lines connected to Rutherford. (J W Burren)

Q2. What is the earliest time the users will be able to run interactive programs on the new system?

Q3. Will a VM system be available to batch users when the 3032 is a back-end machine?

A2/3. Access to CMS will be possible for a limited number of local Rutherford terminals from June of this year. Access from terminals on work-stations or from terminals on the SRC network will not be available until the end of the year. A preliminary CMS service should be available towards the end of the year. A policy for controls on the use of full interactive computing under CMS has not been worked out yet. (J W Burren)

Q4. Will there still be facilities for standard HASP workstations in VNET?

A4. Yes. (A Mayhook)

Q5. When will the Tuesday and Thursday system development periods end?

A5. They will be stopped as soon as possible. (A Mayhook)

Q6. What is the size of virtual storage which will be available to batch programs?

A6. We shall start with a 2Mb MVT system in the 3032. When this system is running satisfactorily and we have gained some experience with VM we shall see about providing a large virtual MVT machine. (A Mayhook)

Q7. What will happen to the link via the Daresbury node?

Q8. What thought has been given to the question of integration with the GEC 4000 series machine?

A7/8. Links to the outside world are intended to function as they do with the Dual 195 system. (A Mayhook)

Q9. What is CMS and why is so much work required? Will it replace ELECTRIC eventually?

A9. CMS is a terminal system providing file editing and job submission and a lot of other facilities. Some work will be needed on it before the system can be released for users. ELECTRIC is now overloaded and it is not practicable to extend it. CMS will be introduced initially to supplement ELECTRIC. In the long term it may replace ELECTRIC, but this will depend on how satisfactory it is and how the users react to it. (A Mayhook)

Questions

General

Q10. When the mass archive is done, would it be better to do it to level 2?

Q11. It is difficult to recompile large programs where many of the routines are archived as space is not available for restoring. Is it possible to put archived routines to tape?

Q12. Could arrangements be made to list archived files?

A10/11/12. Just because a file has not been used does not mean it won't need to be restored quickly. Because of the recent increase on level 0 file space, it will not be necessary to do another mass archive for some considerable time, if at all.

We are considering a temporary restore mechanism whereby files may be restored for up to 24 hours for use with commands which are "read only". The users file space accounts would not be altered and such files would then be archived again. There is a program available to archive to tape. User Support Group are usually willing to allocate space on 'loan' basis. (T G Pett)

Q14. There have been many occasions lately when the user has been logged off by ELECTRIC without receiving the LOGOUT message.

A14. Probably this is due to the system going down or line breaks (so that MAST sends logout to ELECTRIC). (C Balderson)

Q15. Does permission have to be obtained to export load modules containing NAG routines?

A15. Yes. (P J Hemmings)

Q16. Does the licensing restriction apply just to the NAG Library or to others such as the CERN Library as well?

A16. It applies to most libraries. If in doubt consult the Program Advisory Office. It is standard courtesy to acknowledge the use of other people's software. (P J Hemmings)

Q19. Will the 195 recognise a mixture of 2 and 3 character identifiers?

A19. Yes. It has been decided to adopt a scheme in which current users will continue to use two character identifiers. New users will be issued with three character identifiers beginning with the letter 'O'. (T G Pett)

Q20. When will the new scheme of identifiers be implemented?

A20. It is intended that the changes to allow three character identifiers should be implemented fully by the end of the second quarter of this year. (T G Pett)

Q21. Should users be encouraged to use ELECTRIC in view of the 3032 development?

A21. It is likely that ELECTRIC will be frozen in the near future and development concentrated on CMS. The long term future of ELECTRIC has not been decided. One possibility is that new users will only be allowed access to CMS and existing users will be encouraged to transfer. (T G Pett)

Questions

Remote Users

Q22/23. Are you going to continue with EPSS terminal? Would it be better on the 4080 node?

A22/23. It will remain as long as the Post Office provides EPSS. The closing date for the service has not been published but it is expected to continue for about 1 year.

It is possible that a connection could be provided between the new Post Office Packet Switching Service (PSS). However a considerable software effort would be required and it is not certain that this would be available. (C Balderson)

Q24. Will the special print chain be available?

A24. Yes, if there are sufficient requests. (C Balderson)

Q25. Is it possible to use ELECTRIC via METRONET, eg from ULCC when, for instance, an RL workstation goes down?

A25. METRONET provides job submission and retrieval only, not terminal support across the network. (C Balderson)

Q27. Could I transfer files from WYLBUR at CERN to the 195?

A27. A full suite of utility programs has been prepared for transferring files between CERN and RL machines. See Section 7 of this issue of FORUM. (C Balderson)

Q28. Does the data transfer include a binary feature?

A28. HASP allows transmissions to be 'transparent' (binary) or non-transparent (text). All RL lines are defined for transparent working. (C Balderson)

Q29. Is it possible to access 4080 workstation files from another workstation?

A29. Yes. (C Balderson)

Q30. The IBM 360/195 computers are heavily loaded, while the 370/195 at Daresbury appears to be lightly loaded. What steps are being taken to move work to the Daresbury machine?

A30. The Facility Committee for Computing recommends overall allocations of computing facilities for the SRC Boards. It is left to the Laboratory managements to decide how the allocations will be divided in line with the programmes they support. For 1979/80, the allocations to the Nuclear Physics and Science Boards are 7070 and 2500 equivalent 195 cpu hours respectively. A preliminary division of these allocations between Daresbury and Rutherford Laboratories yields 720 and 1320 respectively to DL with 6350 and 1180 at Rutherford. The division for the Science Board represents a major alteration in the distribution of its computing. After allowing for the support of Laboratory facilities such as Laser and SNS, there is little time left for work supported by Science Board grants at Rutherford. It seems likely that efforts to move more Chemistry work to Daresbury will be necessary. (E B Fossey)

Council approved the purchase of the IBM 3032 for the Rutherford Laboratory in principle at its meeting on 17th December. The processor was delivered on 26th March 1979 and was accepted on 4th April. During the first week of April the IBM 3032 was coupled to the dual 195 system and a service to users (Phase 1) was initiated on 10th April 1979.

The Role of the 3032

The first part of the development programme is to mount VNET (under VM) on the IBM 3032. Its main function is to replace that part of HASP which handles RJE stations and network software.

A great deal of the design of VNET is already worked out and now that the first phase of the operating system has been so successful it is intended that coding should start in early May. It is estimated that this system should be in working order by September/October.

During the last quarter of 1979, all RJE and network hardware will be transferred to the IBM 3032. The system has been designed such that this can be carried out in stages. During this period the job I/O queue, ELECTRIC and COPPER will still be handled by the front-end 195. That is, there will be a stage when the IBM 3032 will appear to be the front-end as far as all the telecommunications hardware is concerned, but the 195 will still control the job queues. Transfer of the telecommunications hardware to VNET will, however, remove the compute and core requirements of HASP-RJE from the 195.

Once all the telecommunications hardware is under the control of VNET, the front-end software (HASP, ELECTRIC, COPPER) will be transferred to the IBM 3032 and will operate under VM/MVT.

In parallel with the above programme, CMS (Conversational Monitoring System) will be developed under VM. It should be noted that CMS is more than just a replacement for ELECTRIC. It is in a sense an operating system in its own right. In the long term ELECTRIC (which currently runs under MVT) will be transferred to run under VM/CMS. In principle other terminal systems such as TSO and WYLBUR could also run under VM in parallel with ELECTRIC. Whether it would be wise to do this is for later consideration.

We hope to have limited version of CMS running in the IBM 3032 in July. This will be used under strict control for educational purposes. A user service will not be available until early 1980.

Development Programme

A considerable programme of software development has to be done before the IBM 3032 can act in its defined role as a front end processor. Studies began in collaboration with IBM in early 1978, and a phased programme of development has been identified.

The elements of the programme are as follows:

- (a) Generation of the VM operating system on a 'stand-alone' IBM 3032 before acceptance. Now complete.
- (b) Generation of coupled 3-Machine-System with VM mounted on the IBM 3032 and MVT on the dual 195 system. Now in operation (Phase 1).
- (c) Development of VNET to allow telecommunications to be transferred from the IBM 360/195 to the IBM 3032 (probably fourth quarter 1979).
- (d) Introduction of CMS on the IBM 3032 and transfer of ELECTRIC to the IBM 3032 (probably first quarter 1980).

Installation and Acceptance

The hardware was delivered on March 26. Assembly began on March 28th, and by March 30th RL systems staff were given access for preliminary testing of acceptance software.

The Rutherford Laboratory version of VM was developed on an IBM installation in Birmingham during January-March, and so presented few problems with the IBM 3032. Final acceptance tests were completed on April 4th.

Introduction of the Three Machine Configuration

Service on the dual 195 system was interrupted for a period of 12 hours on Saturday 7th April for a re-configuration of channels to couple together the three processors. This was a major task and was accomplished within the predicted timescale.

A first version of a 3-Machine operating system was introduced operationally on the evening of Tuesday 10th April 1979. Although this identified many problems which had still to be resolved, we were sufficiently confident to continue running the system during the Easter holiday period. This was all the more remarkable because operating staff were left very much on their own to resolve the many problems which emerged.

The apparent ease with which the above programme has been accomplished belies the magnitude of the task. It was only through the co-ordinated efforts of IBM, the Council Works Unit, Systems and Operations staff, meticulous attention to planning and careful commissioning that so much has been achieved.

The Current Operational Mode (Phase 1)

Because of the considerable development program that lies ahead, it was considered desirable to introduce a method of operating that would provide users with some immediate benefit.

Initially the IBM 3032 has been added as a second Back End. One 195 continues as the Front End processor taking care of workstations, terminals, ELECTRIC etc. The major difference is that the IBM 3032 runs under VM, a Virtual Machine operating system, allowing development systems to run in parallel.

During prime shift, extra computing will be provided by the 3032 for short development jobs. It is intended to allocate more 195 core to ELECTRIC in the front end machine which should allow us to raise the 'bar' on the number of simultaneous users to 70. This will cause some decrease in the number of short jobs handled by the front end 195. The net effect however should be to improve ELECTRIC access and to improve short job turn around.

Outside prime shift, the 3032 will provide additional batch power. During the Easter holiday this proved beneficial in reducing the backlog of production jobs that had grown during the period of low performance of the dual 195 system.

It is too early to comment in detail on the comparative performance of the IBM 3032 and the 195. For compile jobs the 3032 is almost as good as the 195. An average performance figure for all jobs is probably about 0.5. Jobs with heavy floating point and double precision requirements go much better on the 195. A method of job selection is still to be worked out.

SECTION 3 SOME CHANGES TO ELECTRIC

Changes which have taken place in ELECTRIC since the last edition of FORUM was issued are listed below.

i) Spaces as Delimiters. Embedded spaces in keywords or values (not in quotes or after colon) are treated as separators. Spaces may still surround commas or equals, or precede the first parameter or colon. Colon is interpreted as before and will be the last parameter on a line. The following are equivalent:

```
LOGI ID=LR,ACCT=1234,KEY=ABCD
LOGI ID=LR ACCT=1234 KEY=ABCD
```

A value must be completely enclosed in quotes if it is to contain a comma, an equals, a left bracket (though not for qualified filenames), a colon or a quote (as the first character of the

value). If a value contains one or more quotes (not as the first character), then the value need not be enclosed in quotes and the quotes need not be doubled. Thus the following command is legal:

```
$E SS=)'':ABC
```

A null value is indicated by a comma or by two quotes:

```
$E SS=,LN=3:,ABC(20)    or    $E LN=3 SS='':,ABC(20)
```

Spaces are still removed from commands coming from online programs. Only users at terminals may use spaces as separators.

ii) Positional Parameters. Most commands now permit the use of one or more positional parameters where the keyword and equals sign are omitted. The value is interpreted by its position in the parameter list. Keyword parameters maybe interspersed with positionals as desired. For example, the following are equivalent:

```
LOGI ID=LR ACCT=1234 KEY=ABCD
LOGI LR 1234 ABCD
LOGI LR KEY=ABCD ACCT=1234
```

Positional parameters are defaulted by giving one or more commas. For instance, TYPE has positionals FL, LN and NL. Default FL by:

```
TYPE ,3 2    or    TYPE LN=3 NL=2
```

To default the linenumber, use two commas together:

```
TYPE FRED,,2    or    TYPE FL=FRED LN=2
```

A complete list of positional parameters follows. FL is the first for most commands. In edit mode LN is first.

<u>COMMAND</u>	<u>POSITIONAL PARAMETERS</u>		
APPE	FL	LB	
ARCH	FL	LEVEL	
CHAN	FL		
CLEA	FL		
COPY	FL	FL2	
CRED	FL		
DELE	FL		
ENTE	FL	LB	
EXAM	FL		
EXEC	FL		
FIND	FL		
LIST	TYPE	ID	
LOGI	ID	ACCT	KEY
MAIL	FL	TOID	
MESS	TOID		

MODI	FL	LB		
PARM	FL1	FL2	FL3	...
PRINT	FL1	FL2	FL3	...
PUNC	FL1	FL2	FL3	...
RENA	FL	FL2		
REST	FL			
ROOM	TYPE	ID		
SCRA	FL			
SET	C			
TAPE	VOL	FL1	FL2	FL3
TRAN	ID	ACCT	KEY	
TYPE	FL	LN	NL	
USER	ID			
\$A	LN	FL		
\$C	LN	L2		
\$D	LN	L2		
\$E	LN	SS	L2	COL
\$I	LN			
\$L	LN	NL	DL	
\$M	LN	NL	DL	
\$P	LN	NAME		
\$R	LN	L2		
\$S	LN	NAME		
\$X	LN			

This list is kept in the ELECTRIC file DOC=ELECTRIC.COMMANDS.
For example, to find the positional parameters for \$E:

```
T DOC=ELECTRIC.COMMANDS,NL=1:$E
or T DOC=ELECTRIC.COMMANDS,,,1:$E
```

N.B. The PARM command behaves slightly differently for the PRINT, PUNCH and TAPE commands. Successive PARM commands carrying positionals will define more filenames, rather than redefine FL1, FL2 etc. The following commands are equivalent:

```
PARM FL1=FRED FL2=JIM ROUTE=23 FL3=JOE
PARM FL4=AA FL5=BB PRI=10 FL6=CC
PRINT FL7=DD LB=ED
```

```
PARM FRED JIM ROUTE=23 JOE
PARM AA BB PRI=10 CC
PRINT DD LB=ED
```

Values of positional parameters should still be enclosed in quotes if they contain commas, colons, left brackets or quotes (as the first character), and double quotes may still be used to prevent translation to upper case.

Keywords must begin with a letter. If not of type 'NM' they will be interpreted as values of positional parameters.

iii) Syntax Checking. ELECTRIC now reports syntax errors, "pointing" to the character position at which the error is discovered by replying with a "\$" in the appropriate column followed by the NF=22 SYNTAX ERROR message. For example,

```
LOGI ID=LR,ACCT==9275
          $
NF=22 SYNTAX ERROR
```

Similarly if an illegal edit is typed when modifying an edit file, the changed edit will be typed back to the user with the pointer below the error followed by the NF=22 SYNTAX ERROR message.

iv) Check Types. The check type 'FI' now permits the E, D and Q exponential forms of floating point constant.

v) TABS Parameter. A new parameter TABS with values T, F, A or U has been added to the .L command. TABS=U is the default. The effects produced are as follows:-

U Unchanged. FORTRAN rules apply as previously.

F FORTRAN rules. If text overruns a tab position, the next tab character causes backwards tabbing.

T Typewriter rules. If text overruns a tab position the next tab character tabs forward to the next position.

A Assembler rules. If text runs up to a tab position or overruns it, the next tab character is converted into a single space and no tabbing takes place at that point.

When TABS=F, T or A, lines with embedded tabs are treated differently. Text up to the last embedded tab is treated as if M=U. Text after this is laid out according to the mode currently in force. If this mode is L, LR or RL, the left margin is temporarily changed to the column defined by the last embedded tab. This text and any subsequent lines are laid out between the temporary left and right margins. The left margin reverts to its previous setting when a blank line, a layout command or another line with embedded tabs is encountered. This facility allows use of tabbing in tables where the last column is explanatory text.

If TABS=U, the default setting, the left margin reverts to its previous setting on the next input line. This maintains compatibility with previous versions of ELECTRIC except that any overflow starts at the last tab position instead of column 1.

vi) Layout Correction. The layout processor has been corrected to ignore the right margin, RM, if the mode setting is M=U. In this case the whole width of the line specified by the value of W on the first .L command is used.

vii) HEADING Parameter. The parameter HEADING has been added for the PRINT command to control the printing of the date and file name. HEADING may have the values YES, NO or CONT (Y,N or C). If HEADING=NO the heading is not printed. If HEADING=CONT, the heading is printed and the file name is repeated at the top of every page. For HEADING=YES the heading is printed. The default action if HEADING is omitted is as previously, that is, the heading is printed unless the FORMS parameter is used.

SECTION 4 "/* NEEDS ELECTRIC" ?

A study of jobs needing the Front End Machine revealed some jobs that use between 210 and 350K. The store available for user jobs on the front end is quite limited and is to be further reduced when ELECTRIC is expanded to 70 users. The space available may be reduced permanently to 350K although it is possible that a smaller ELECTRIC will run at night allowing bigger jobs. It would be preferable if all user jobs which need the front end were as small as possible in particular less than 210K. Users are therefore requested to look at their methods to see if they can meet this aim.

Users are reminded that ELSEND steps can be run as separate jobs with execution conditions governed by /*COND cards. It is recognised that this is not always a suitable solution to the problem, for example if the ELECTRIC step of the job is long and involved but it is often a useful technique. Take care when choosing job names. The problems of distinguishing between jobs of the same name are avoided if you use unique names.

A method of avoiding multistep ELSEND jobs is the use of COPY TODSN and FROMDSN commands to create and extract information from ELECTRIC files. Jobs then use OS datasets which can be accessed from all machines. This technique has the advantage that it avoids the difficulty of ensuring that ELECTRIC is available at the same time as the job runs.

Users are urged to modify their programs as soon as possible. Please contact User Support if you are having difficulty so that your problems can be resolved quickly.

SECTION 5

THE PL/1 OPTIMIZING COMPILER

This compiler is designed for compiling programs written in PL/1 source language into efficient object programs. The main features incorporated in this compiler are:-

- (1) Extensive optimization if required;
- (2) Advanced PL/1 - the addition of new features such as

ATTENTION	condition
DEFAULT	statement
LEAVE	statement
SELECT	statement
ENTRY	variables
FILE	variables
DO UNTIL	(expression);

- (3) Extensive debugging aids.

The optimizing compiler is largely compatible with the PL/1 (F) compiler which has been on the system for some time. Little effort should be necessary for anyone wishing to convert existing programs written in PL/1(F) to use the optimizing compiler; the incompatibilities are described in the programmer's guide.

Manuals for this compiler are:

OS PL/1 Optimizing Compiler: Programmer's Guide,
form no - SC33-0006.

OS PL/1 Checkout and Optimizing Compilers: Language Reference
Manual, form no - GC33-0009.

SECTION 6

USE of METRONET

The CDC Cyber 174/6500 system at the Imperial College Computer Centre is now connected to the MVT system at the Rutherford Laboratory via a series of Communications Processors and a direct 2400 baud synchronous line.

This facility enables any registered SRC user who has access to METRONET to submit jobs to Rutherford Laboratory from their own site and have the resulting output returned to the same site. Users having interactive access to one of the time sharing systems of METRONET have the further advantage of being able to edit jobs there before sending them to Rutherford for execution.

Metronet